

G. D'AMATO¹, A. CORRADO², L. CECCHI³, G. LICCARDI¹, A. STANZIOLA⁴,
I. ANNESI-MAESANO⁵, M. D'AMATO⁴

A relapse of near-fatal thunderstorm-asthma in pregnancy

¹Division of Respiratory and Allergic Diseases, Department of Respiratory Diseases; High Speciality Hospital A.Cardarelli Napoli Italy - E-mail: gdamatomail@gmail.com

²Division of Respiratory Diseases, Hospital "Careggi" Florence Italy

³Allergy and Clinical Immunology Section, Azienda Sanitaria di Prato, Prato Italy

⁴Division of Respiratory Diseases, Medical School "Federico II", University Hospital "Dei Colli" Napoli, Italy

⁵INSERM, UMR S 707: EPAR, Paris, F-75012 France

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Corresponding author

Gennaro D'Amato MD
Director, Division of Respiratory and Allergic Diseases, Department of Respiratory Diseases, High Speciality "A.Cardarelli" Hospital, Napoli Italy
gdamatomail@gmail.com

SUMMARY

Thunderstorm-related asthma is a dramatic example of the allergenic potential of pollen antigens. Pollen allergic patients who encounter the allergenic cloud of pollen during a thunderstorm are at higher risk of having an asthma attack. Relapse is also possible and we describe here the first case of relapse of near fatal thunderstorm-asthma occurred in a 36 years old, 20 weeks pregnant woman affected by seasonal asthma and sensitized to allergens released by Parietariapollen. Patients suffering from pollen allergy should be alerted of the danger of being outdoors during a thunderstorm in the pollen season and if they experienced an episode of severe thunderstorm-related asthma could be at risk of a relapse during a heavy precipitation event.

An increasing body of evidence shows the occurrence of severe asthma epidemics during thunderstorm in the pollen season (1-3). We describe here the first case of relapse of near fatal thunderstorm-asthma occurred in a 36 years old, 20 weeks pregnant woman affected by seasonal asthma and sensitized to *Parietaria* (pellitory of the wall) pollen, as confirmed by both skin prick and blood tests. She was involved in the 2005 epidemics in Naples (3) and had a mild relapse in 2011. The 28th of May 2012, she experienced a severe dyspnoea about two hours after being outdoor during a thunderstorm. She was admitted at the ER and unsuccessfully treated with adrenaline (1 ml i.m.), high dose steroids (2 gr methylprednisolone i.v.); then she was intubated and transferred to the intensive unit. Despite a four days full systemic therapy with oxygen (FiO₂:0.60), methylprednisolone (1 gr/die i.v.), and albuterol (1 fl i.v.), pCO₂ increased to 103 mmHg. Theophylline (240 mg in continuous infusion) was added, resulting in a pCO₂ reduction to 90 mmHg. Clinical picture dramatically improved only after two infusions of

magnesium sulfate (2 gr i.v.), with a normalization of arterial blood gas parameters. At day 8, patient was extubated, steroids slowly tapered and magnesium sulfate infused for 2 days more; fluticasone via aerosol was given at 500 mcg/twice. Clinical and ultrasound checks did not show any foetal distress. Patient could be discharged with inhalers (1000 mcg fluticasone/die) and oral prednisone (25 mg/die). As in the previous two episodes, symptoms appeared after a thunderstorm occurred during the *Parietaria* pollen season (pollen count was 36 grains/m³ air on the 28th of May and 108 grains/m³ the 27th). Main pollutants levels did not show any significant change in respect of the previous days. However, delivery occurred with caesarean section at week 32th and the baby was in good health with normal Apgar's index. This case report confirms the hypothesis that both thunderstorm and pollen or fungi play a key role in thunderstorm asthma epidemics (4); in fact, the patient never experienced severe exacerbations when exposed to thunderstorm or *Parietaria* pollen separately. In the case described here, clinical picture

markedly improved after infusion of magnesium sulfate, with classic acute asthma treatments resulting unsuccessful. Although shown as safe and effective in severe acute asthma (5), including in pregnancy, magnesium sulfate is not widely used in the ERs, except in Germany, UK and North-America (5-6). Main mechanism of magnesium's action is the bronchial smooth muscle relaxation via its ability to inhibit the release of calcium from vesicles in the sarcoplasmic reticulum (7).

Two recent studies based on large samples sizes confirm the existence of thunderstorm-related asthma cases. In Ottawa, Canada, asthma visits among children aged 2–15 yrs were significantly associated with thunderstorm activity (OR 1.35, 95% CI 1.02–1.77) (8). In Atlanta, GA, USA, a statistically significant association was observed between daily counts of asthma emergency department visits and thunderstorm occurrence ($p < 0.001$) (9). In addition, most Hill's causality criteria, although not all, support the hypothesis of a link between thunderstorms and asthma attacks or exacerbations through pollen or mould exposure (2).

In conclusion, present case and previous literature (1,2) show that a small subgroup of asthmatics with IgE-mediated sensitization to pollens and/or mould spores is at risk of severe, even near-fatal, exacerbations, when exposed to a thunderstorm during the pollen/spores season.

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